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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/639,870	08/16/2000	Michael A. DeJack	199-1164	3207

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EXAMINER

THANGAVELU, KANDASAMY

ART UNIT	PAPER NUMBER
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2123

DATE MAILED: 12/16/2003

45

Please find below and/or attached an Office communication concerning this application or proceeding.

pre

<b>Office Action Summary</b>	Application N .	Applicant(s)	
	09/639,870	DEJACK ET AL.	
	Examiner	Art Unit	
	Kandasamy Thangavelu	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 16 August 2000.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 August 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☐ All b) ☐ Some \* c) ☐ None of:  
 1. ☐ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
 a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 & 3                      6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Introduction***

1. Claims 1-24 of the application have been examined.

### ***Drawings***

2. The drawings are objected to; see a copy of Form PTO-948 for an explanation.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 states in the preamble, "A system of generating a finite element mesh for a threaded fastener and joining structure assembly".

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Claim 1 states in the limitations, “a finite element model of the mesh model of the threaded fastener and joining structure assembly generated on the computer system using finite element analysis;”

“a user evaluating the finite element model using the computer system” and

“the user using the computer system to predict a stress of the threaded fastener and joining structure assembly from the evaluation of the result of the finite element analysis”.

One of ordinary skill in the art will consider the finite element analysis to comprise four steps:

- creation of the finite element mesh comprising nodes and elements;
- generation of the finite element model which includes the mathematical models for certain parameters at the various nodes of the finite element mesh;
- finite element analysis which involves executing the mathematical models generated using a CAD tool; and
- analysis of the results of the finite element analysis and calculation of additional parameters. of interest to the users are calculated.

The prediction of the stress may be done in the finite element analysis step or in the analysis of the results of the finite element analysis step.

It is not clear as to why in a system of generating a finite element mesh, the generation of finite element model, the evaluation of the finite element model using the computer system and the evaluation of the results of the finite element analysis should be included.

Since the Applicants have included all the four steps in the system, the examiner has interpreted the “system of generating a finite element mesh for a threaded fastener and joining

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structure assembly”, as “the system of performing a finite element analysis for a threaded fastener and joining structure assembly”.

Claim 1 states, “a finite element model of the mesh model of the threaded fastener and joining structure assembly generated on the computer system using finite element analysis”. It is not clear as to how the finite element model of the mesh model is generated using the finite element analysis, since the finite element model is created in the second step using the mesh model as input and the finite element analysis (executing the mathematical models on a computer) is performed in the third step using the finite element model.

Claim 1 states, “a user evaluating the finite element model using the computer system”; and

“the user using the computer system to predict a stress of the threaded fastener and joining structure assembly from the evaluation of the result of the finite element analysis”.

It is not clear as to what the applicants mean by “evaluating the finite element model” and “the evaluation of the result of the finite element analysis”.

It is also not clear how the applicants “predict a stress of the threaded fastener and joining structure assembly”, as the stress will vary from point to point and has to be computed separately for each node on the thread profile of the fastener and the joining structure assembly.

Claims 2-12 are rejected under 35 U.S.C. 112, second paragraph because of their dependence on the rejected claim 1.

5. Claim 1 is rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential structural cooperative elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01.

Claim 1 states, “a finite element model of the mesh model of the threaded fastener and joining structure assembly generated on the computer system using finite element analysis” and “the user using the computer system to predict a stress of the threaded fastener and joining structure assembly from the evaluation of the result of the finite element analysis”.

The claim does not specify what the finite element model comprises that would allow the user to predict a stress of the threaded fastener and joining structure assembly.

Claim 1 states in the preamble, “A system of generating a finite element mesh for a threaded fastener and joining structure assembly”. The system includes a computer system, a mesh model and a finite element model. As discussed in Paragraph 4 above, since the system includes the components for all the four steps of the finite element analysis process, the examiner has interpreted it as “the system of performing a finite element analysis for a threaded fastener and joining structure assembly”.

For this finite element analysis system to be functional, it requires an evaluator that will evaluate the finite element model (perform finite element analysis) and another evaluator that will evaluate the results of the finite element analysis to predict a stress of the threaded fastener

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and joining structure assembly. Since the applicants have not included these essential elements in the claim, the claim is incomplete as a system claim, making it indefinite.

6. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 states in the preamble, "A system of generating a finite element mesh for a threaded fastener and joining structure assembly". So the claim appears to be a system claim.

Claim 1 includes the limitation, "a user evaluating the finite element model using the computer system"; and

"the user using the computer system to predict a stress of the threaded fastener and joining structure assembly from the evaluation of the result of the finite element analysis".

These two limitations list the steps involved in predicting a stress of the threaded fastener and joining structure assembly, making the claim appear to be a method or process claim.

Since the claim combines the system and process statutory classes, it is indefinite. A single claim which claims both an apparatus and the method steps of using the apparatus is indefinite under 35 U.S.C. 112, second paragraph. *In Ex parte Lyell, 17 USPQ2d 1548 (Bd. Pat. App. & Inter. 1990).*

Claims 2-12 are rejected under 35 U.S.C. 112, second paragraph because of their dependence on the rejected claim 1.

7. Claims 13-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13 states in the preamble, “A method of generating a finite element mesh for a threaded fastener and joining structure assembly”.

Claim 13 states, in the limitations, “evaluating the mesh model of the threaded fastener and joining structure assembly using finite element analysis;”

“evaluating a result of the finite element analysis” and

“predicting a stress of the threaded fastener and joining structure assembly from the evaluation of the result of the finite element analysis”.

One of ordinary skill in the art will consider the finite element analysis to comprise four steps:

- creation of the finite element mesh comprising nodes and elements;
- generation of the finite element model which includes the mathematical models for certain parameters at the various nodes of the finite element mesh;
- finite element analysis which involves executing the mathematical models generated using a CAD tool; and
- analysis of the results of the finite element analysis and calculation of additional parameters. of interest to the users are calculated.



The prediction of the stress may be done in the finite element analysis step or in the analysis of the results of the finite element analysis step.

It is not clear as to why in a method of generating a finite element mesh, the evaluation of the mesh model using finite element analysis, the evaluation of the results of the finite element analysis and predicting a stress of the threaded fastener and joining structure assembly should be included.

Since the Applicants have included all the four steps in the method, the examiner has interpreted the “method of generating a finite element mesh for a threaded fastener and joining structure assembly”, as “the method of performing a finite element analysis for a threaded fastener and joining structure assembly”.

Claim 13 states, in the limitations, “evaluating the mesh model of the threaded fastener and joining structure assembly using finite element analysis;”

“evaluating a result of the finite element analysis” and

“predicting a stress of the threaded fastener and joining structure assembly from the evaluation of the result of the finite element analysis”.

It is not clear as to what the applicants mean by “evaluating the mesh model of the threaded fastener and joining structure assembly using finite element analysis” and “evaluating a result of the finite element analysis”.

It is also not clear how the applicants “predict a stress of the threaded fastener and joining structure assembly”, as the stress will vary from point to point and has to be computed separately for each node on the thread profile of the fastener and the joining structure assembly.

Claims 14-24 are rejected under 35 U.S.C. 112, second paragraph because of their dependence on the rejected claim 13.

8. Claim 13 is rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the necessary steps. See MPEP § 2172.01.

Claim 13 states, in the limitations, “evaluating the mesh model of the threaded fastener and joining structure assembly using finite element analysis;”

“evaluating a result of the finite element analysis” and

“predicting a stress of the threaded fastener and joining structure assembly from the evaluation of the result of the finite element analysis”.

The claim does not specify what the mesh model comprises that would allow the user to predict a stress of the threaded fastener and joining structure assembly.

Claim 13 states in the preamble, “A method of generating a finite element mesh for a threaded fastener and joining structure assembly”. The method includes the step of generating a mesh model of the threaded fastener and joining structure assembly. As discussed in Paragraph 7 above, since the method includes the components for all the four steps of the finite element analysis process, the examiner has interpreted it as “the method of performing a finite element analysis for a threaded fastener and joining structure assembly”.

For this finite element analysis method to be operational, it requires the step of “generating a finite element model of the mesh model of the threaded fastener and joining structure assembly using finite element mesh”. Claim 13 does not state, “generating a finite element model of the mesh model of the threaded fastener and joining structure assembly using the finite element mesh”.

Since the applicants have not included these essential steps in the claim, the claim is incomplete as a method claim, making it indefinite.

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to the Applicants' disclosure.

The following patents and papers are cited to further show the state of the art at the time of Applicants' invention with respect to finite element analysis of threaded fastener and joining structure assembly.

1. Hukari, “Enhanced fatigue nut”, U.S. Patent 5,927,921, July 1999.
2. Miller et al., “Composite fastener for use in high temperature environments”, U.S. Patent 6,045,310, April 2000.
3. Shimmell, “Method for incorporating boundary conditions into finite element analysis”, U.S. Patent 5,956,500, September 1999.

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4. Hibbitt et al., "Computer process for prescribing an assembly load to provide pretensioning simulation in the design analysis of load bearing structures", U.S. Patent 5,920,491, July 1999.
5. Medeiros et al., "fastening lug", U.S. Patent 6,074,121, June 2000.
6. Wood et al., "Oilless high pressure pump", U.S. Patent 6,467,394, October 2002.
7. Assimakopoulos, "Fastener", U.S. Patent 5,738,476, April 1998.
8. Aidun, "Method and apparatus to enhance paper and board forming qualities", U.S. Patent 6,153,057, November 2000.
9. Burgoon et al., "Brake hub with floating rotor", U.S. Patent 6,267,210, July 2001.
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is 703-305-0043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:30 PM.

If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska, can be reached on (703) 305-9704. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-9600.

K. Thangavelu  
Art Unit 2123  
December 1, 2003

  
**SAMUEL BRODA, ESQ.**  
**PRIMARY EXAMINER**